



# **The Clear Skies Act of 2003**

**Georgia and Clear Skies**



# Highlights of Clear Skies in Georgia

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- Georgia sources would reduce emissions of SO<sub>2</sub> by 89%, NO<sub>x</sub> by 77%, and mercury by 76% by 2020 due to Clear Skies.
- The health benefits in Georgia would total \$5.3 billion annually (\$960 million under the alternative estimate) and include approximately 700 fewer premature deaths (400 under the alternative estimate) and 1,500 fewer hospitalizations/emergency room visits each year.
- In addition, Georgia would receive environmental benefits, including improved visibility and reduced nitrogen loading to sensitive estuaries.
- Clear Skies does not significantly impact electricity prices. With or without Clear Skies, electricity prices in the electric supply region that includes Georgia are expected to remain below 2000 prices.

# Clear Skies: An Innovative Approach to Improving Human Health and the Environment

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## Why Clear Skies?

- **Air quality has improved, but serious concerns persist**
  - Georgia's citizens suffer ill effects from air pollution, including asthma attacks and premature death
- **Electricity generation sector remains a major emissions source**
  - Very cost-effective to control the power sector, relative to other sources
  - Sources are concerned about upcoming complex and burdensome regulations

## Advantages of the Clear Skies Approach

- **Guarantees significant nationwide emissions reductions – beginning years before full implementation**
  - Georgia sources would substantially reduce emissions of SO<sub>2</sub>, NO<sub>x</sub>, and mercury
  - Delivers dramatic progress towards achievement of critical health and environmental goals
- **Uses proven, market-based flexible approach with incentives for innovation**
  - Recognizes environmental needs as well as industry constraints, allowing industry to better manage its operations and finances while lowering risks to the public
  - Sources are projected to install pollution controls to enable continued reliance on coal
- **Increases certainty across the board for industry, regulators, and consumers**

# Under Current Clean Air Act Power Plants Would Face a Complex Set of Requirements

## NSR Permits for new sources & modifications that increase emissions

### Ozone

1-hr Serious Area Attainment Date

Designate areas for 8-hr Ozone NAAQS

1-hr Severe Area Attainment Date

Marginal 8-hr Ozone NAAQS Attainment Date

8-hr Ozone Attainment Demonstration SIPs due

Assess Effectiveness of Regional Ozone Strategies

Moderate 8-hr Ozone NAAQS Attainment Date

**Note:** Dotted lines indicate a range of possible dates.

<sup>1</sup> Further action on ozone would be considered based on the 2007 assessment.

<sup>2</sup> The SIP-submittal and attainment dates are keyed off the date of designation; for example, if PM or ozone are designated in 2004, the first attainment date is 2009

EPA is required to update the new source performance standards (NSPS) for boilers and turbines every 8 years

Serious 8-hr Ozone NAAQS attainment Date

Possible Regional NO<sub>x</sub> Reductions ? (SIP call II)<sup>1</sup>

NO<sub>x</sub> SIP Call Reductions

NO<sub>x</sub> SIPs Due

OTC NO<sub>x</sub> Trading

Phase II Acid Rain Compliance

Mercury Determination

Proposed Utility MACT

Final Utility MACT

Designate Areas for Fine PM NAAQS

Interstate Transport Rule to Address SO<sub>2</sub>/ NO<sub>x</sub> Emissions for Fine PM NAAQS and Regional Haze

Compliance with Utility MACT

New Fine PM NAAQS Implementation Plans

Regional Haze SIPs due

Latest attainment date for Fine PM NAAQS <sup>3</sup>

Compliance for BART Sources

Compliance for BART sources under the Trading Program

Second Regional Haze SIPs due

## Acid Rain, PM<sub>2.5</sub>, Haze, Toxics

In developing the timeline of current CAA requirements, it was necessary for EPA to make assumptions about rulemakings that have not been completed or, in some case, not even started. EPA's rulemakings will be conducted through the usual notice-and-comment process, and the conclusions may vary from these assumptions.

# Clear Skies Sets a Firm Timeline for Emission Reductions

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**2004: The NO<sub>x</sub> SIP call (summertime NO<sub>x</sub> cap in 19 Eastern States + D.C.)**

**2004**

The existing Title IV SO<sub>2</sub> cap-and-trade program provides an incentive and a mechanism to begin reductions upon enactment of Clear Skies years before regulatory action under the current Act.

**2008: Clear Skies NO<sub>x</sub> Phase I (2.1 million ton annual cap assigned to two Zones with trading programs)**

**2008**

**2010: Clear Skies Hg Phase I (26 ton annual cap with a national trading program)**

**2010**

**2010: SO<sub>2</sub> Phase I (4.5 million ton annual cap with a national trading program)**

**2018: Clear Skies NO<sub>x</sub> Phase II (1.7 million ton annual cap assigned to two Zones with trading programs)**

**2018**

**2018: Clear Skies Hg Phase II (15 ton annual cap with a national trading program)**

**2018: Clear Skies SO<sub>2</sub> Phase II (3.0 million ton annual cap with a national trading program)**

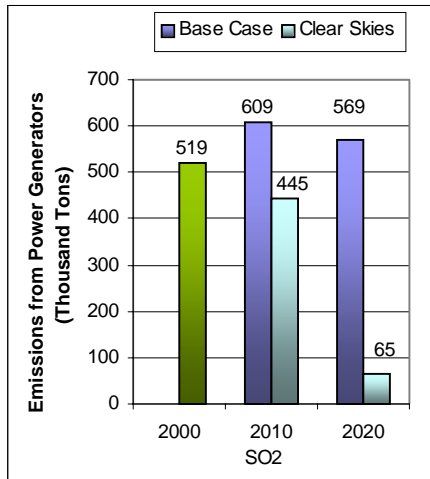
# Emissions in Georgia under Clear Skies

**Emissions in Georgia (2020) would be significantly reduced from 2000 levels:**

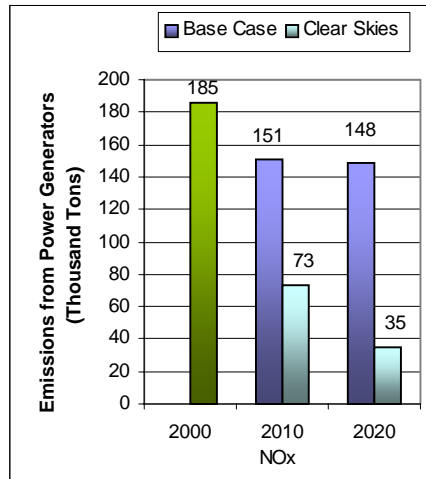
- 87% reduction in SO<sub>2</sub> emissions
- 81% reduction in NO<sub>x</sub> emissions
- 70% reduction in mercury emissions

**Emissions: Current (2000) and Existing Clean Air Act Regulations (base case\*)  
vs. Clear Skies in Georgia in 2010 and 2020**

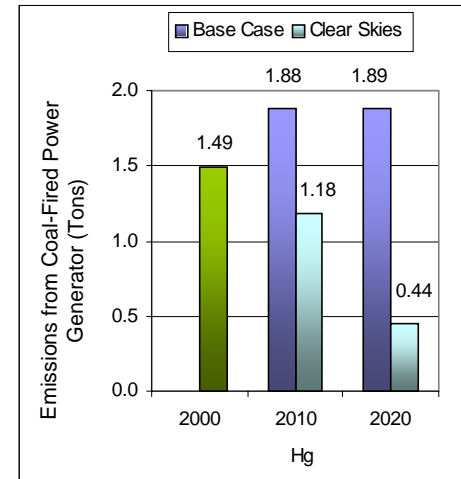
**Sulfur dioxide**



**Nitrogen oxides**



**Mercury**



Note: The base case using IPM includes Title IV, the NO<sub>x</sub> SIP Call, NSR settlements, and state-specific caps in CT, MA, MO, NC, NH, TX, and WI. It does not include mercury MACT in 2007 or any other potential future regulations to implement the current ambient air quality standards or other parts of the Clean Air Act. Base case emissions in 2020 will likely be lower due to state and federal regulatory actions that have not yet been promulgated.

# Clear Skies Health Benefits in Georgia

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## Improve Public Health

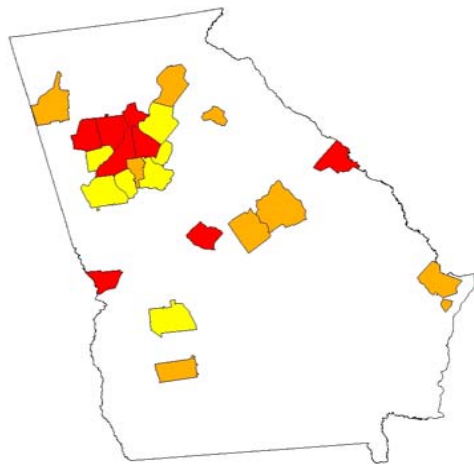
- **Reduced ozone and fine particle exposure** by 2020 would result in public health benefits of:
  - approximately 700 fewer premature deaths each year<sup>1</sup>
  - approximately 500 fewer cases of chronic bronchitis each year
  - approximately 1,000 fewer non-fatal heart attacks each year
  - approximately 1,500 fewer hospital and emergency room visits each year
  - approximately 95,000 fewer days workers are out sick due to respiratory symptoms each year
  - approximately 6,000 fewer school absences each year
- **Reduced mercury emissions** would reduce exposure to mercury through consumption of contaminated fish, resulting in additional, unquantified benefits for those who eat fish from Georgia's lakes, streams, and coastal waters.

**By 2020, Georgia would receive approximately \$5.3 billion in annual health benefits from reductions in fine particle and ozone concentrations alone due to Clear Skies.<sup>1</sup>**

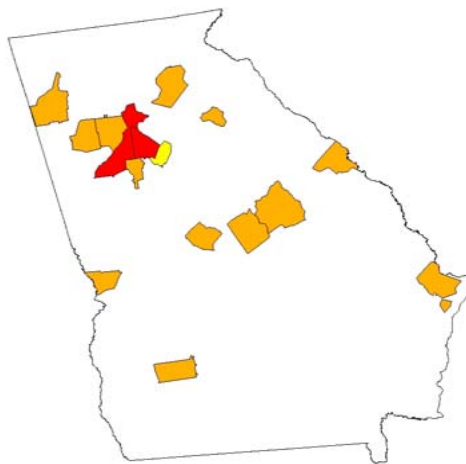
1. An alternative methodology for calculating health-related benefits projects approximately 400 premature deaths prevented and \$960 million in health benefits each year in Georgia by 2020.

# Counties Projected to Remain Out of Attainment with the PM<sub>2.5</sub> and Ozone Standards in Georgia<sup>1</sup>

Current Conditions






2010 Base Case



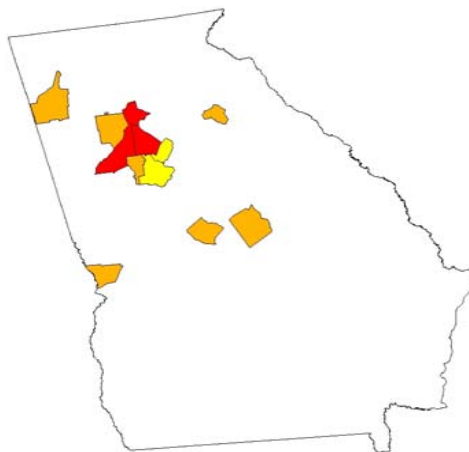
2020 Base Case



## Legend

-  out of attainment with the 8-hour ozone standard only
-  out of attainment with the annual fine particle standards only
-  out of attainment with both standards

2010 Clear Skies



2020 Clear Skies



1. Based on 1999-2001 data of counties with monitors that have three years of complete data.

Note: The base case includes Title IV, the NO<sub>x</sub> SIP Call, the Tier II, Heavy-Duty Diesel, and Nonroad Diesel rules, final NSR settlements as of early spring 2003, and state-specific caps in CT, MA, MO, NC, NH, TX, and WI. It does not include mercury MACT or any other potential future regulations to implement the current ambient air quality standards or other parts of the Clean Air Act. It does not include additional reductions states must achieve in order to attain the standards by the attainment dates.

# Clear Skies Would Help Georgia Meet Air Quality Standards

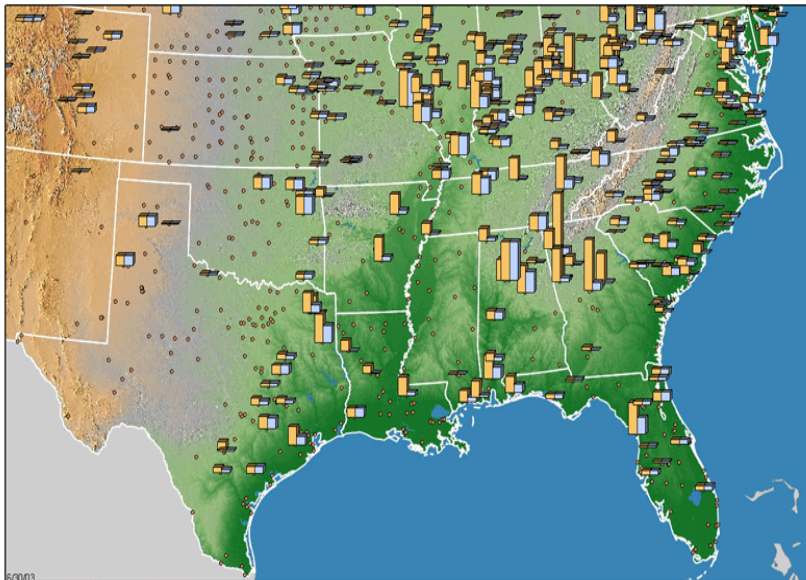
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- Currently there are 15 counties exceeding the annual fine particle standards and 14 counties exceeding the 8-hour ozone standard.<sup>1</sup>
  - Some of these counties are expected to be brought into attainment with the fine particle standards under existing programs.
  - All of these counties are expected to be brought into attainment with the ozone standard under existing programs.
- **Clear Skies would significantly improve air quality in many counties in Georgia** beyond what is expected from existing programs.
  - By 2010, Clear Skies would bring 6 non-attainment counties (Chatham, Dougherty, Hall, Paulding, Richmond, Washington--population approximately 800,000) into attainment with the annual fine particle standards.
  - By 2020, Clear Skies would bring 7 additional counties (Bibb, Clarke, Clayton, Cobb, Floyd, Muscogee, and Wilkinson--population approximately 1.4 million) into attainment with the annual fine particle standards.
  - Ozone concentrations in Henry County are projected to be 85 parts per billion (ppb) with Clear Skies in 2010 and 84 ppb without Clear Skies in 2010 (compared to 107 ppb currently), causing the county to appear out of attainment in 2010 with Clear Skies. By 2020, Henry County is projected to be in attainment with the 8-hour ozone standard both with Clear Skies (70 ppb) and without Clear Skies (71 ppb).

1. Based on 1999-2001 data of counties with monitors that have three years of complete data

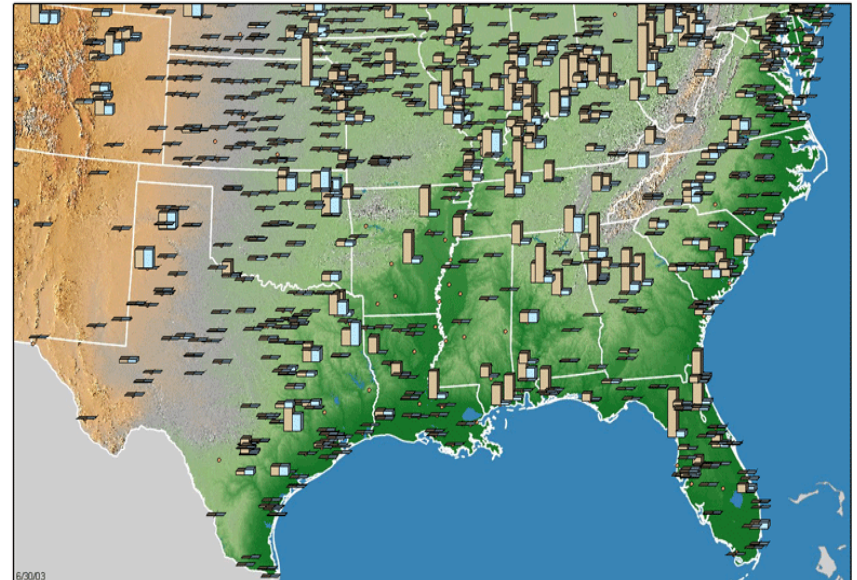
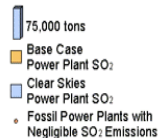
# SO<sub>2</sub> and NO<sub>x</sub> Emissions Reductions under Clear Skies

Emissions in Georgia and surrounding states would decrease considerably. These emission reductions would make it much easier for Georgia to comply with the national air quality standards.



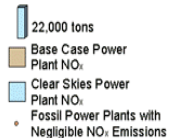
Projected SO<sub>2</sub> Emissions from Power Plants  
with the Base Case and Clear Skies (2020)

South



Projected NO<sub>x</sub> Emissions from Power Plants  
with the Base Case and Clear Skies (2020)

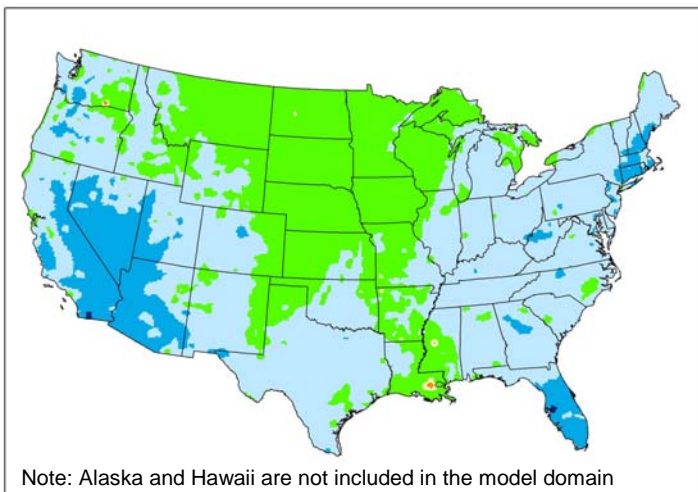
South



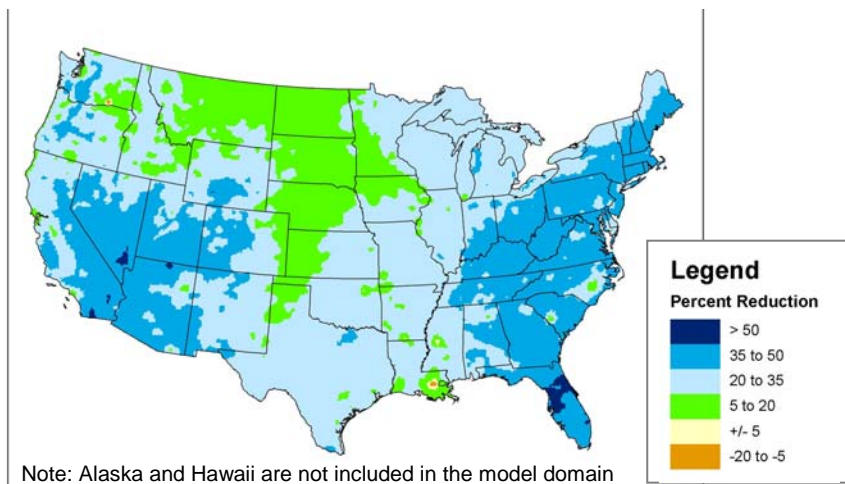
Note: The base case in IPM includes Title IV, the NO<sub>x</sub> SIP Call, NSR settlements, and state-specific caps in CT, MA, MO, NC, NH, TX, and WI. It does not include mercury MACT in 2007 or any other potential future regulations to implement the current ambient air quality standards or other parts of the Clean Air Act. Base case emissions in 2020 will likely be lower due to state and federal regulatory actions that have not yet been promulgated. Emissions projected for new units in 2020 are not reflected.

# Clear Skies Environmental Benefits in Georgia

## Projected Changes in Nitrogen Deposition with the Base Case in 2020 Compared to 2001



## Projected Changes in Nitrogen Deposition with Clear Skies and the Base Case in 2020 Compared to 2001



## Clear Skies Would Provide Substantial Environmental Benefits in Georgia

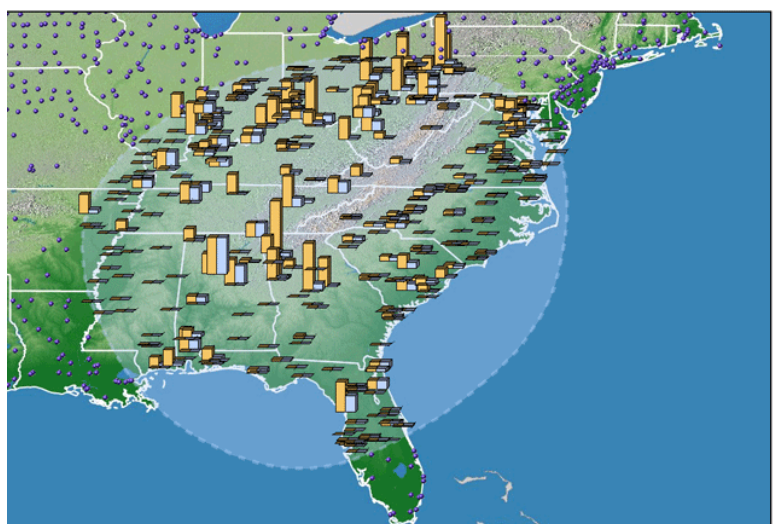
In comparison to existing programs:

- **Visibility would improve perceptibly in Georgia.**
  - The value of improved visibility for Georgia residents who visit National Parks and Wilderness areas throughout the country would be \$110 million each year by 2020.
- **Sulfur deposition, a primary cause of acid rain, would decrease by 30-60% across much of the state.**
- **Nitrogen deposition to nitrogen-sensitive estuaries, such as Sapelo Sound and Cumberland Sound, would be reduced by up to 35%.**
- **Mercury deposition would decrease by 5-15% across much of the state and by 30-60% in some areas in central Georgia.\***

\* These results are based on modeling the Clear Skies mercury cap without triggering the safety valve.

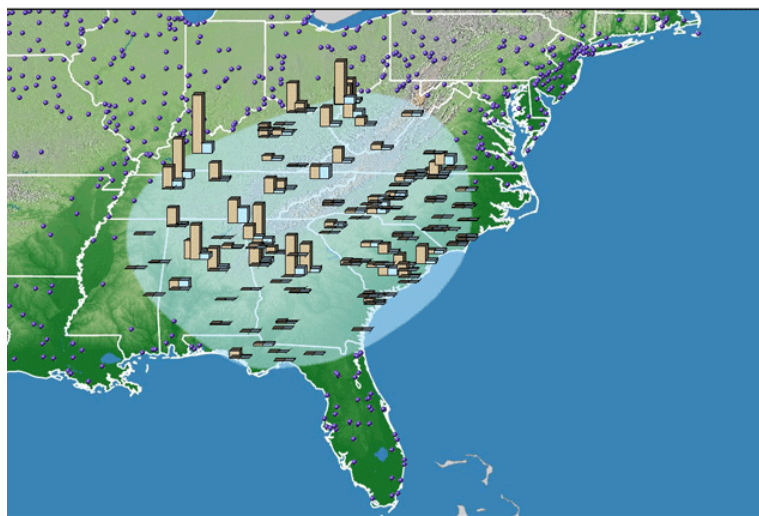
# Airsheds for the Southern Blue Ridge Mountains

- This page shows regional airshed maps that were developed for the Southern Blue Ridge Mountains (which includes Great Smoky Mountain National Park).
- Multiple emission sources in numerous states contribute to air quality degradation and acid deposition in the Southern Blue Ridge region.
- In 2020, emissions from power plants in the Southern Blue Ridge region are projected to be substantially lower with Clear Skies than under the Base Case:
  - $\text{SO}_2$  emissions are projected to decrease 61%;
  - $\text{NO}_x$  emissions are projected to decrease 68%.



**Projected  $\text{SO}_2$  Emissions from Existing Power Generation Sources in the Southern Blue Ridge Airshed in 2020**

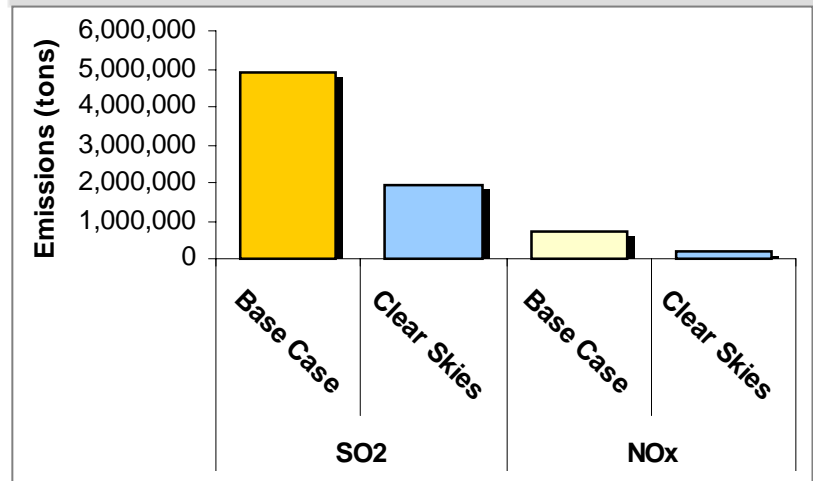
■ Base Case     ■ Clear Skies     --- sulfur airshed  
 Scale: 75,000 tons ■ ● other fossil fuel power plants



**Projected  $\text{NO}_x$  Emissions from Existing Power Generation Sources in the Southern Blue Ridge Airshed in 2020**

■ Base Case     ■ Clear Skies     --- nitrogen airshed  
 Scale: 22,000 tons ■ ● other fossil fuel power plants

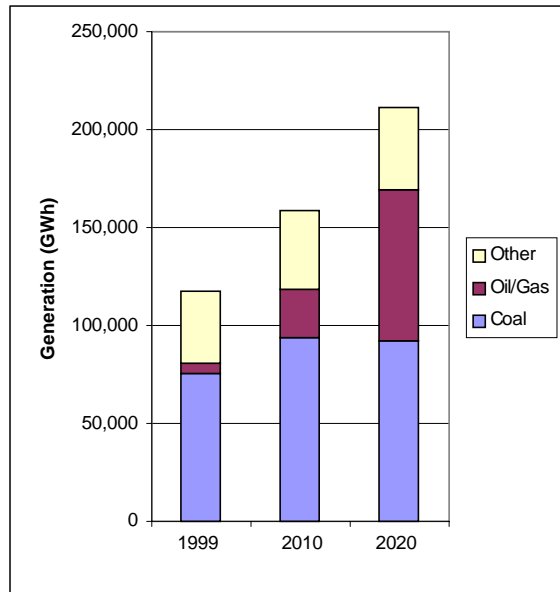
**$\text{SO}_2$  and  $\text{NO}_x$  Emissions in the Airsheds (2020)**



**Note:** An "airshed" depicts a modeled approximation of a large proportion of sources contributing to air quality in a particular receptor region.

# Electricity Generation in Georgia under Clear Skies

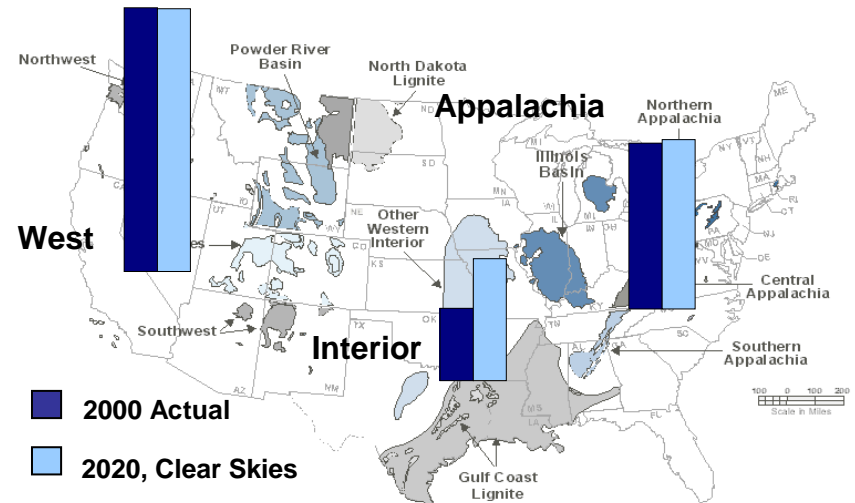
Current and Projected Generation by Fuel Type in Georgia under Clear Skies (GWh)



- Georgia's electricity growth is projected to be met by increases in gas-fired and coal-fired generation. Clear Skies does not significantly alter this projection.
  - Electricity from coal-fired generation will increase by 21% from 1999 to 2020.

- Georgia's sources are projected to reduce their emissions through the installation of emission controls, rather than through a switch from coal to natural gas.
  - In 2010, 70% of Georgia's coal-fired generation is projected to come from units with advanced SO<sub>2</sub> and/or NO<sub>x</sub> control equipment that also substantially reduce mercury emissions; in 2020, the percentage is projected to increase to 98%.
  - No coal-fired units in Georgia are projected to be removed from operation as a result of Clear Skies.

Current and Projected Coal Production for Electricity Generation



Scale: Appalachia 2000 = 299 million tons

# Emission Controls in Georgia under Clear Skies

- **Under Clear Skies by 2020...**

- No SCR or SNCR would be installed
- 94% would install scrubbers

- **The major generation companies in Georgia include:**

- Georgia Power Company
- Savannah Electric & Power Co.
- Oglethorpe Power Corporation

- **Total coal-fired capacity in Georgia is projected to be 12,930 MW in 2010**

## Units in Georgia Projected to Be Retrofitted Due to Clear Skies by 2020

Plant Name	Unit ID	Technology
BOWEN	1BLR	Scrubber
BOWEN	2BLR	Scrubber
BOWEN	3BLR	Scrubber
BOWEN	4BLR	Scrubber
HAMMOND	1	Scrubber
HAMMOND	3	Scrubber
HAMMOND	4	Scrubber*
HARLLEE BRANCH	1	Scrubber
HARLLEE BRANCH	2	Scrubber
HARLLEE BRANCH	3	Scrubber
HARLLEE BRANCH	4	Scrubber
JACK MCDONOUGH	MB1	Scrubber
JACK MCDONOUGH	MB2	Scrubber
MITCHELL	3	Scrubber
SCHERER	1	Scrubber*
SCHERER	2	Scrubber*
SCHERER	3	Scrubber*
SCHERER	4	Scrubber*
WANSLEY	1	Scrubber
WANSLEY	2	Scrubber
YATES	Y4BR	Scrubber
YATES	Y5BR	Scrubber
YATES	Y6BR	Scrubber
YATES	Y7BR	Scrubber

\* Retrofit was installed under Clear Skies by 2010

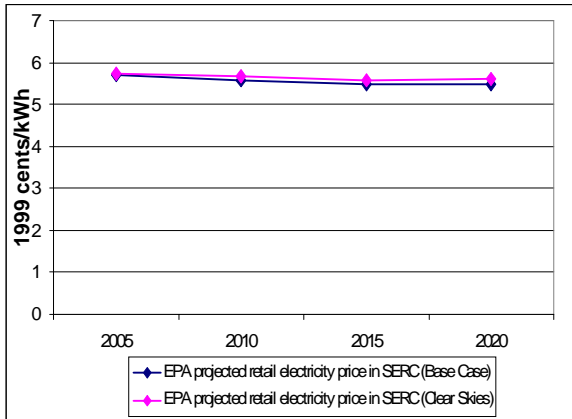
Note: Retrofits and total coal-fired capacity apply to coal units greater than 25 MW. Assumed SCR installed to comply with NOx SIP Call that should extend to Georgia by 2005.

# Electricity Prices in Georgia under Clear Skies

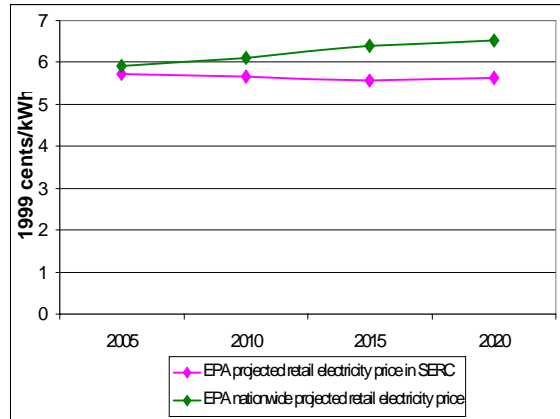
- With or without Clear Skies, retail prices in the North American Electric Reliability Council (NERC) SERC region (the electricity supply region that contains Georgia) are projected to decrease between 2005 and 2020.
- With Clear Skies, retail prices are projected to be approximately 0.7 – 2.8% higher between 2005 and 2020 than in the absence of the legislation.



Projected Retail Electricity Prices in Georgia under the Base Case and Clear Skies (2005-2020)



Projected National Retail Electricity Prices and Prices in Georgia under Clear Skies (2005-2020)



In 2000, the average retail electricity price in Georgia was approximately 6.2 cents/kWh, which was below the average *national* retail price of approximately 6.7 cents/kWh.

# Costs and Benefits in Georgia under Clear Skies

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## Benefits Outweigh the Costs

- **In Georgia, Clear Skies is projected to cost approximately \$575 million annually by 2020 while providing health benefits totaling approximately \$5.3 billion annually.**
- **The increases in production costs under Clear Skies represent only a small percentage of total retail electricity sales revenue in Georgia.**
  - Retail electricity sales revenue in Georgia was over \$7.5 billion in 2000.
  - Adjusting these sales revenues by the same growth rate used for the modeling of costs would result in revenues of almost \$11.6 billion annually in 2020.
- **Nationwide, the projected annual costs of Clear Skies (in \$1999) are \$4.3 billion in 2010 and \$6.3 billion in 2020; the nationwide benefits of Clear Skies are expected to be over \$113 billion annually by 2020.**
  - An alternate estimate projects annual health benefits totaling \$23 billion.

### Clear Skies....

- **Guarantees significant emissions reductions – beginning years before full implementation**
- **Uses a proven and flexible market-based approach with incentives for innovation**
- **Increases certainty across the board for industry, regulators, and consumers**

Note: Costs include capital costs, fuel, and other operation and maintenance costs (both fixed and variable) associated with the achievement of the emissions caps in the legislation (for example, the installation and operation of pollution controls). These state-level production costs are estimates; they do not account for the costs associated with the transfer of electricity across regions, nor the costs or savings that could be associated with allowance movement between sources.

# Notes on EPA's Analysis

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- The information presented in this analysis reflects EPA's modeling of the Clear Skies Act of 2003.
    - EPA has updated this information to reflect modifications:
      - Changes included in the Clear Skies Act of 2003.
      - Revisions to the Base Case to reflect newly promulgated rules at the state and federal level since the initial analysis was undertaken.
    - The Clear Skies modeling results presented include the safety valve feature
  - This analysis compares new programs to a Base Case (Existing Control Programs), which is typical when calculating costs and benefits of Agency rulemakings.
    - The Base Case reflects implementation of current control programs only:
      - Does not include yet-to-be developed regulations such as those to implement the National Ambient Air Quality Standards.
    - The EPA Base Case for power sector modeling includes:
      - Title IV, the NO<sub>x</sub> SIP Call, NSR settlements, and state-specific caps in Connecticut, Massachusetts, Missouri, New Hampshire, North Carolina, Texas, and Wisconsin finalized before March 2003.
    - For air quality modeling, the Base Case also includes federal and state control programs, as well as the Tier II, Heavy Duty Diesel, and Non-Road Diesel rules.
- **For more information regarding the Clear Skies Act, please visit the EPA website:**

(<http://www.epa.gov/clearskies>)

